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PAPERS

IN

COLONIES AND TRADE.

COLONIES AND TRADE.

The GOLD MEDAL of the Society was this Session voted to ISAAC WINSLOW CLARKE, Esq. of Montreal, in Canada, for his CULTURE and PREPARATION of HEMP in that Province; and for the Importation of upwards of two thousand five hundred weight thereof into the port of London, as certified by the following ACCOUNTS.

SIR,

I BEG leave to lay before the Society for the Encouragement of Arts, &c. the enclosed observations on manufacturing into cordage and twine about 2580 pounds weight of hemp, raised by J. W. Clarke, Esq. last year, upon his farm, near Montreal, in Canada.

I send also a small coil of rope made from this hemp, and a sample of it in the rough state; and I hope that the

Society,

Society, with a view to the encouragement of an object of such national importance, as the cultivation of hemp in our own colonies will confer upon Mr. Clarke a suitable reward for his very laudable exertions.

I am, Sir,
Your obedient servant,
JOHN BRICKWOOD, jun.

P.S. The following experiments and observations have been furnished me on Mr. Clarke's hemp.

Billiter-square, July 18, 1803.
CHARLES TAYLOR, Esq.

Observations on CANADA HEMP, *by Mr.* ROBERT RICH, *Rope-maker, Dock-head.*

Respecting the Hemp imported from Canada, I have to observe, that having worked it, I find it extremely foul and clung, which is owing to its not being properly bracked.

I have no reason to alter my opinion as to the strength; and I also find that it will take a sufficient quantity of tar for its preservation for maritime uses; but from the foulness or bad brackage, it will not make such handsome cordage as the Petersburgh hemp; neither, till that complaint is obviated, will it be able to stand in competition with it in this, or any other market.

The Petersburgh hemp in general is divided into sundry classes, which comprehend

Petersburgh clean, or best staple hemp.
Ditto outshot, second, or trifling inferior.
Ditto half-clean, third, inferior.
Ditto Codilla, worst, or rooty parts.

All which have different prices in the market, and the Canada hemp I have been working has all these qualities together; which proves the necessity of better bracking or dividing the qualities, so as to render it marketable. It is also farther necessary to remark, that more attention must be paid to the packing or tying it up together, so as to make the beds or head layers of a more general length, and to tying them up more firm and compact, which will conduce to render it more saleable.

As a proof of the general strength of it, I have made that kind of trial of it, adopted by Government, and required by them in their contracts, and find that out of sixteen threads which I tried, the whole separately carried the three-quarters of a hundred, which is the weight required by them at three feet length; and that fifteen of the sixteen carried one hundred weight, and would have carried more.

Observations on CANADA HEMP, *by Messrs.* WM. *and* GEO. FOWLER, *Twine and Net Makers, Bridport.*

Presuming it to be your wish we should state the observations we have to make on this hemp, and the opinion we have formed of its qualities and value, from the experiment we have made on it, we shall proceed to do so somewhat particularly.

We observe it is very long, rooty, and foul. Its length exceeds any we have seen from the Baltic, being nearly equal to what is grown in Italy; whence we conclude that the soil and climate are congenial to its growth; and we see nothing in its strength or texture that militates against this opinion. In these latter qualities, and also in its colour when dressed, it resembles what is grown in this county, and the neighbouring parts of Somersetshire, more nearly than any we have seen from any other country. In length it exceeds our country produce, as well as the Russian, with which ours in this respect nearly corresponds. Its great length, however, does not increase, but diminish, its value for our manufactures, and we think must do so for any other, there being no manufactory with which we are acquainted, for which our own and the Russian growth are not sufficiently long. Indeed, if this hemp were broken, like the Russian, into assortments, and kept distinct, the first assortment would of course be materially reduced in length, and thereby rendered more valuable, although it should be no better cleaned from the stalk than the present; and still more so, if it was made more clean in this respect, and the rooty parts taken away, which we conceive to be very practicable. The defects in these two last respects in the present parcel, and the loose manner in which it appeared to be packed, we ascribe to the infant state of its culture and management, and conclude these will naturally be corrected by a longer practice, especially if aided by a few experienced men, and stimulated by proper encouragement.

Its extreme rootiness may perhaps be occasioned by the hemp growing too thin on the land, owing either to an insufficient quantity of seed being sown on it, from a part of it being defective from age or damage in the principle of vegetation, or to its being picked up from the land by birds, which in general are very fond of this seed.

On account of its being so foul and rooty, the expense of preparing it for our manufactures is necessarily much increased, and its produce considerably lessened; but when properly prepared and well managed in the subsequent processes, the twines, &c. will, in our opinion, be equal, if not superior, to those made from the best assortments of Russia hemp. Those calculated for the fisheries, especially, we believe, will make stronger and more durable nets than any Russian hemp whatever. We could not, however, have brought the twines to this perfection, with this parcel of hemp, without the assistance of the machinery we possess.

A Certificate, signed by Mr. J. Beck, Surveyor at the Custom-House of Montreal, in the province of Lower Canada, states—that five bales, containing 2586 pounds net weight of hemp, the product and manufacture of Montreal, in the province of Lower Canada, were shipped on board the Britannia, William Thompson, master, bound for London, on the 28th of June, 1802, by Isaac Winslow Clarke, Esq.

The GOLD MEDAL of the Society, or ONE HUNDRED DOLLARS, at his option, were this Session voted to Mr. JACOB SCHNEIDER, of York, in Upper Canada, for his CULTURE of HEMP in that province.

SAMPLES of the HEMP and SEED are reserved in the Society's Repository, and the following COMMUNICATION was received from him.

SIR,

ON account of Jacob Schneider, a farmer of this place, I transmit you Governor Hunter's Certificate, with the Affidavits and other Vouchers, relative to the man having raised a certain quantity of hemp, &c. &c.

Agreeably to the mode advertised for cultivating the same, to obtain the bounty, I also forward at this time a keg, containing 28 lb. of hemp, and 2 lb. of hemp-seed to your address. It will not reach you till next season. When it does, if it proves sufficient to entitle the man to any thing, either premium or bounty, you will please to transmit whatever it may be to me, on his account.

I have the honour to be,
SIR,
Your most obedient servant,
W. ALLAN.

York, Upper Canada, Nov. 18, 1802.

CHAS. TAYLOR, Esq.

Upper Canada.

I, PETER HUNTER, Esq. Lieutenant-Governor of the province of Upper Canada, do hereby certify to the Society established for the Encouragement of Arts, &c. that it has been declared to me upon oath, that Jacob Schneider, of the township of York, in the home district of this province, yeoman, did, at the end of May, in this present year, sow in drills eighteen inches apart, hemp seed, on six acres, in separate fields (containing three acres each), in the said township; and did, during the last ten days of September following, pull the male hemp on the said six acres, and did continue the winter hemp on the same, until the seed was ripe, which was in the end of October and beginning of November, when the said hemp was pulled. That the said six acres, during the third week of May preceding, were ploughed and sown the week after: that one of the fields was of a rich loamy soil; the other of a soil rich, but sandy; and that the produce amounted to two hundred averdupoise weight of hemp on each acre, the expense of cultivation being about ten shillings for every acre of the said lands.

Given at York, under my hand and seal at arms, this 17th day of

November, in the year of our Lord, 1802.

P. Hunter, Lieut. Gov.

SIR,

ACCEPT my thanks for the trouble you took in enclosing me the two lists of Premiums offered by the Society, which afford satisfaction in this country to many who have no other opportunity of seeing them. There is every probability, that the culture of hemp for exportation from this country, more particularly from the province of Upper Canada, will eventually have the desired effect; and the more support it receives in its infancy, the sooner will this be ascertained.

There has been a very considerable quantity exported this present year, and many affidavits state its being cultivated at a small expense.

I rest assured, that the keg will reach you before the end of the year. In that case, Mr. Schneider will have his chance of success.

I have the honour to be,
SIR,
Your most obedient servant,
W. ALLAN.

York, Upper Canada, Nov. 19, 1803.

CHARLES TAYLOR, Esq.

The SILVER MEDAL of the Society, or EIGHTY DOLLARS, at his option, were this Session voted to Mr. DANIEL MOSHER, of Kingston, in Upper Canada, for his Culture of HEMP in that province.

SAMPLES of the HEMP and SEED are reserved in the Society's Repository.

The following COMMUNICATION was received from him.

SIR,

I AM instructed by Lieutenant-General Hunter, Lieutenant-Governor of the province of Upper Canada, to state to you, that several individuals in this province have, with some degree of success, attempted the culture of hemp, notwithstanding the difficulty of procuring seed, and other obstacles, which, in a country similar to this, cultivators, in attempting any thing that is new, must necessarily meet with.

The Lieutenant-Governor has granted certificates in favour of some cultivators, who are ambitious of the honour of obtaining the premiums held forth to this province by the Society for the Encouragement of Arts, &c. These certificates, however, have not been drawn up according to the rules prescribed, as the cultivators (although the facts stated by them were true, and sufficiently authenticated) did not come prepared with the documents required to substantiate their claims.

The difficulty in communicating the necessary instructions to the different parts of this province; the want of attention, even the ignorance of many of the cultivators, some of them not understanding the language in which these instructions are conveyed, have unavoidably produced this inconvenience.

The Lieutenant-Governor, however, hopes, that the same public spirit and liberality, which induced the Society to hold forth these premiums to the cultivators of hemp in this province, will also induce it to overlook their regularity and want of form, which too evidently appear in the steps that have been taken to obtain them.

I have the honour to be, Sir,
Your most obedient servant,
JAMES GREEN, Jun.

York, Upper Canada, Feb. 22, 1803.

CHAS. TAYLOR, Esq.

Account of HEMP *raised in the township of Kingston, in the year* 1802, *by Mr.* DANIEL MOSHER, *sowed broad-cast.*

	EXPENSE.		
	£.	s.	d.
Sowed broad-cast, on new land well burned, 2¾ acres, 8 perches, not ploughed, but harrowed four times, at, per acre -	0	10	0
One bushel and a half of seed per acre, at 25s. per bushel - - -	1	17	6
Cutting, rooting, and stacking, per acre	1	0	0
Cleaning the hemp, averaging 7 cwt. per acre	2	16	0
Total expense, broad-cast	£6	3	6

ACCOUNT

Account *of* Hemp *raised in the township of Kingston, in the year* 1802, *by Mr.* Daniel Mosher, *sowed in drills.*

	EXPENSE.		
	£.	s.	d.
Sowed in drills, eighteen to twenty inches asunder, on a black mould, 3½ acres 5 perches, twice ploughed, harrowed four times. Whole expense of drilling, sowing, &c. per acre - - -	2	1	0
Plucking the Summer hemp - -	1	12	0
Rooting and cleaning the Summer hemp -	1	0	0
Cutting, thrashing, and cleaning, the Winter hemp seed - - - - -	2	0	0
Expense of one acre	£6	13	0

Note—The produce of one acre of hemp, sown in drills as above,—

The Summer hemp, one hundred and seven pounds.
The Winter hemp, seventeen bushels and a half.

A Certificate from James Ferguson, Esq. one of his Majesty's Justices of the Peace for the midland district of the province of Upper Canada, accompanied the above papers, testifying that the statement contained in them is just and true.

The THANKS of the Society were this Session voted to Dr. WILLIAM ROXBURGH, of Calcutta, for the following interesting COMMUNICATION on the Culture, Properties, and comparative Strength of HEMP, and other VEGETABLE FIBRES, the Growth of the EAST INDIES.

DEAR SIR,

YOUR letter of the 16th of May, 1799, I received on my return to Bengal in October last; but that from the Society established in London, for the Encouragement of Arts, &c. of which you are a Member, is not to be found.

I was rather surprised, on my return to Bengal, to find the Directors had sent out a person (Mr. Sinclair) to establish the cultivation of hemp, a thing I had begun some time before. Even on the coast of Coromandel, ten or twelve years ago, I made a most successful trial, the result of which was laid before that Government, to be sent to the Honourable Court of Directors; and again in Bengal, since my appointment to the station I now hold. Mr. Sinclair is dead, and the experiment is still carried on in a most expensive manner; whereas it could be continued where it was first begun, in the Botanic Garden, at no expense, and with more prospect of success. Should Government continue to be the cultivator, the price will be enormous. Eighty pounds weight is all, I believe, that is yet forthcoming, and costs from 10,000 to 20,000 rupees. Such experiments throw a complete check in the way of all attempts to introduce new, or improve old, branches of agriculture and commerce. A small premium should be offered to the Natives, and honorary rewards to Europeans, after the example is set on a small and not expensive scale.

The Botanic Garden was at first made very large, four times more than was necessary for such a garden, the intention of which was merely to make experiments, and to invite the Natives to see and profit by the examples in husbandry carried on there.

A quantity of my bow-string flax was, I understand, sent from the coast about two years ago, for the Directors. I could wish to know what was done with it; for, to me, it seems to be the strongest vegetable fibre we are acquainted with. I mean to send some by the January ships from hence, through the medium of this Government, and wish it may fall into your hands, and that its qualities may be properly examined by the Society for the Encouragement of Arts. I am really sorry that the letter, inviting me to become an honorary corresponding Member of that Society, should have been lost. I beg you will assure the Society, that I am sensible of the honour they have done me, and shall be very happy to have it in my power to contribute my mite to promote the views of that laudable Institution.

When any new object, promising to become useful in the arts or manufactures of our country is discovered, and reported to your Society (for example, the bow-string flax), the Society will probably address the Court of Directors, and recommend the cultivation and importation into England of the commodity itself.

Another object, of more national importance, which I recommended to this Government, before I went to the Cape, was the growth of one of the most noble of the palms, the *arrow*, mentioned in Marsden's History of Sumatra, page 77, and said to yield at an early age (from five to seven years), fibres ready prepared by nature, flexible, strong, and most durable, and the most convenient for cables and cordage of all kinds, that can be desired. It also yields great abundance of Palm wine, which can be converted into sugar or ardent spirits; and when the tree is old, its pith is the basis of the Sago we so much value. I have distributed many hundred plants, and have still a great number in the Garden,* beside many thousand seeds in the ground. Drawings, and a description of this most valuable tree, were sent to the Directors, under the name of *Saguerus Rumphii;* but as the trees from which they were taken have advanced in size and age, a new set of drawings, and a new description, or the old one corrected, becomes necessary. They will be sent to the Directors this season. The object may be such as your Society wish to attend to; and on that account I have ventured to trouble you with the above statement.

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* Feb. 1801. About 100,000 plants have been reared in this Botanic Garden since the date of this letter.

I am, dear Sir,
Your most obedient servant,
W. ROXBURGH.

Calcutta, Dec. 24, 1799.

ROBERT WISSETT, ESQ.

DEAR SIR,

MY letter of the 24th of December, 1799, I am afraid, has not reached you. The experiments on hemp, therein mentioned, have not, I believe, thrown much additional light on the subject. My friend, Capt. Burrows, of the Earl Howe, has done more to make our own indigenous species (the *sun* of the Bengalese) better known, than any other person I am acquainted with.

For these last twelve months my attention has been much taken up in collecting and comparing the various vegetable fibres of Asia, &c. used for cordage, cloths, and paper. The result of these I have lately presented to the Supreme Government, to be sent to the Hon. the Court of Directors, in reply to the 79th paragraph of their General Letter of the 7th of May last. This Paper may be interesting to your Society, particularly at this time, when the attention of all good patriots is drawn towards the discovery of a substitute for Russian hemp. This Paper, with my former Essays, contain much information on the subjects therein mentioned.

The *sun* of the Hindoos, which is the prepared fibres of the bark of a well-known Indian plant, the *crotalaria juncea* of Linnæus, still appears to me to be the most promising substitute for hemp which has come to our knowledge; I mean, when every circumstance, relative to its quickness of growth, its being already universally known and cultivated by all the nations of India. its low price, pliableness, strength, durability, &c. &c. are taken into consideration. All that can be necessary for the procuring and transporting to England any quantity of this material, is to ensure the cultivator a certain price, and ready market for the commodity; and to have it properly cleaned and packed, to render the freight as low and convenient as possible. Cleaned samples of this very substance were sent by me, six or seven years ago, to the Directors; so that the fault is not mine, if it is not already better known than it seems to be.

The discovery of a substitute for Russian hemp is certainly an object of the first magnitude. If *sun* is found to be the best substitute yet discovered, and costs in India, say, when properly cleaned, ten pounds per ton, and the freight sixteen pounds, there will still be a considerable profit to the merchant, particularly in times of war; for, I believe, it rarely happens that hemp sells so low in London as thirty pounds per ton. Should the subject appear of consequence to you, I beg you will call the attention of the Members of your Society to it.

That I may not encroach too much on your time, I will close this letter by referring you to my friend Mr. Boswell, the late Marine Storekeeper and Naval Paymaster, for any farther information you may want. I send this package by him. Mr. Babb, late a Member of the Board of Trade here, can also give you much information.

I am, dear Sir,
Your most obedient servant,
W. ROXBURGH.

Calcutta, Feb. 27, 1801.

ROBERT WISSETT, Esq.

Observations

Observations on the Culture, Properties, and comparative Strength of HEMP, SUN, JUTE, *and other* VEGETABLE FIBRES, *the Growth of* INDIA, *communicated by Dr.* ROXBURGH.

HEMP, considered merely as an article of trade, is an object of the first importance to the merchant; but, when we reflect on its various uses, and observe that hardly any art can be carried on without its assistance, or of some other substitute; the objects it embraces are immense, and there are few that better deserve the attention of the philosopher or intelligent artist. Cordage makes the very sinews and muscles of a ship, and every improvement which can be made in its preparation, either in respect to strength, pliableness, or durability, or in bringing to light substitutes equally good, or better, particularly where hemp itself cannot well be had, must be of immense service, particularly to the mariner, and to the commerce and the defence of nations.

The cultivation of this important plant in our Colonies has not only, at all times, met with encouragement from the Government, but also of late from the East-India Company in Bengal, where extensive experiments were begun by the late Mr. Sinclair, and after his death carried on by Thomas Douglas, on the culture of hemp and flax, on account of the Hon. Company. A clear and impartial statement of these trials is to be wished for, as it will, no doubt, throw much light on the cultivation of hemp in India, and enable us to proceed with greater prospects of success than ever.

My own experiments and inquiries on the same subject, both on the coast of Coromandel and Bengal, have been many, though not extensive. Their result leads me to think, that hemp may be cultivated to great advantage over the interior parts of Bengal and Behar, where the seed should be sown about the beginning of the periodical rains, or earlier, if there have been frequent showers, on elevated spots of rich loamy soil, such as the Ryots cultivate tobacco, sun, and paat on, near their habitations. In situations of this nature it thrives well, and will be easily attended to. At first, some encouragement will certainly be necessary, to induce the Ryots to undertake this new branch of agriculture. For, although the plant is perfectly familiar to every Hindoo, yet the cultivation on an extensive scale, for the fibres of its bark, is perfectly unknown to them. I would therefore suggest, that they should pay no rent for the ground so occupied for a certain period; that seed should be given gratis; that they should be ensured a certain price for the hemp; and finally, a reward or premium to the person or persons who produced the greatest quantity of the best hemp within a stated period.

In many parts of Bengal, particularly where the land is so low as to remain humid through the dry-weather season, hemp thrives luxuriantly during the cold season ; but the water is then too cold for macerating the plants to the greatest advantage : one day in June, July, or August, has more effect in loosening the bark, than eight in December, January, or February; consequently, the prolonged immersion injures the quality of the hemp much. The rainy season is therefore preferable for the cultivation and maceration, even if the plant grew better during the cold, which is by no means the case, particularly on lands elevated above the level of the annual inundation of the low rice-fields. We must therefore content ourselves with one crop in the year; for it is a very false notion, and a very prevailing one, that the fertile fields of Asia produce at least two crops annually; as well might we say, that the fertile lands of England yield at least two, because a well-managed garden, near London, or some other large city, will produce repeated crops in the year: so in India, by great care and industry, a spot here and there will produce two or more crops. The burning heats of Asia, while they last, are as unfavourable for vegetation, as the frosts of winter in Europe.

Besides hemp and flax, the vegetable kingdom, particularly that natural division called by Linnæus, Columniferæ, abounds in plants which produce materials fit for cloths, paper, and cordage: almost every nation or country possesses something of the kind peculiar to itself. To ascertain what these are, as well as to find out new ones, to try their comparative strength, durability, texture, &c. has, at various leisure hours, employed my attention for many years past. Drawings and descriptions of many of them, have been already laid before the Honourable the Court of Directors. There are, however, some others which remain to be brought under view and compared with the kinds we are best acquainted with, which I have attempted in the following experiments. Many other sorts are also mentioned by various authors and travellers, of which I know nothing more than the names. Two of these are mentioned by Marsden, at pages 75 and 76 of his History of Sumatra. Others are peculiar to Pegu, &c. &c. These I must omit for the present, and confine myself to such as I am more intimately acquainted with. The better to enable me to proceed in this inquiry, I have cultivated, in the Botanic Garden at Calcutta, many of the plants themselves which produce the materials hereafter mentioned; prepared their fibres in general by maceration, &c. as with hemp and flax in Europe. And, to compare their strength (plain, tanned, and tarred), had them made into cords, composed of three simple yarns, as nearly of the same size and hardness as a Hindoo rope-maker could make them; but, in spite of my utmost care, they were always too hard twisted to be of the greatest possible strength*. Of each sort there were six, when there was a sufficient quantity of the fibres. Three of them were about the size of a log-line, and three a size larger than a whip-cord; one of each size and sort was kept white: the average number of pounds which broke them, (for repeated trials were made, and always with lengths of exactly four feet), will be found in the first and second columns on the right. One of each was tanned* with the astringent fruit called *gaub* by the Bengalese, (Embryopteres Glutinifera, Roxb. Coromandel Plants, Vol. I. No. 70.) Their strength is represented in the third and fourth columns of the following table. And, lastly, one of each sort was tarred: their respective strengths will be found in the fifth and sixth columns.

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* The experiments of Reaumur, Sir Chas. Knowles, and Du Hamel, uniformly prove, that when hemp-rope is twisted to the usual hardness, which is that which brings them to two thirds of the length of their respective yarns, their strength is lessened by nearly one fourth, when compared with ropes consisting of the same number of the same yarns twisted up to only three fourths of their length. There will be no difficulty in accounting for this difference, if we consider that a skein of fibres may be twisted so very hard, as to break with any attempt to twist it harder. In this state the fibres are already strained to the utmost, and cannot support any weight or additional strain.

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* The idea of tanning cordage is far from being new; for the fishermen of Asia, as well as of Europe, not only tan their nets and lines, but also their sails, to give them additional strength and durability. The same process might be productive of the same effects, if employed on cordage made of the materials (No. 2, 5, 6, 7, 8, and 15), specified in these experiments, which induced me to recommend its being tried with sun cordage, in my letter to the Board of Trade, in August, 1797.

We know the tanning principle strengthens the fibres of leather, (animal fibres); but are not so clear that its operation on vegetable matter is uniformly the same. The attention bestowed to ascertain this point in these experiments will, at least, throw some light on the subject; and may induce others, better qualified, to extend the inquiry (here in India), where tanning materials abound.

Another point of the utmost importance to be ascertained is whether tanned ropes will be preserved by the tan, with which they are impregnated, when stowed away wet; as tarred ropes are preserved by the tar when so circumstanced. It is nevertheless a well-known fact, that tarred cordage, when new, is weaker than white; and that the difference increases by keeping. Tar can therefore only be employed to preserve cordage, and not to strengthen it; so that if tan will add strength, or even not weaken vegetable fibres, and at the same time preserve them; of how great advantage to the nation would the discovery of a convenient practicable process be. For all cordage, exposed to be alternately very wet or dry, requires to be impregnated with a preservative. And, to conclude this long note, I beg leave to observe, that tar is not the produce of the warmer parts of Asia. Are we, therefore, to conclude, that no material, the produce of these parts, can be applied for the same end? Let us not entertain any such idea. Nature is abundantly kind, and furnishes every country and climate with what is most proper for the use of its inhabitants.

(See the Comparative Statement, inserted after the next page.)

The annexed statement of the experiments made on the substances there specified, can only be deemed an attempt towards ascertaining their relative strength; and though they are the average result of several trials made on the strength of each cord, plain, tanned, and tarred, yet I must acknowledge they cannot be deemed any thing more than a first essay, chiefly owing to the lines being in general ill laid, some more and some less twisted, and by no means to be compared with those of Europe. For in some instances, I found a small one sustain a greater weight than a much larger, made exactly of the same materials. It is therefore my intention to repeat them on a larger scale, and, if possible, with better made lines; for every thing depends on their being exactly of the same size and degree of twist.

The cords, when the trials were made, had been kept about six months after

COMPARATIVE STATEMENT of the EXPERIMENTS made to in the adjoining Co

NAMES of the PLANTS, and brief REMARKS on the var.ous MATERIALS employe

No. 1. English Hemp: a piece of new tiller-rope, opened out and made into cords, like t
2. Hemp (Cannabis), the growth of this season, from the Company's Hemp Farm, ne
3. Coir: the fibres of the husk of the Cocoa-nut; much used for cables and cordage
4. Ejoo (Saguerus Rumphii): the black horse-hair-like fibres, which grow round the
5. Robinia Cannabina, Dansha of the Bengalese: the fibres of its bark, prepared by
nearly ripened their seed, they are then of a dusky grey colour, and harsh natur
6. The fibres of the bark of No. 5, prepared by maceration, from plants coming int
beautifully white, soft, and glossy..
*7. Crotolaria Juncea, Sun of the Bengalese: the fibres of its bark, and universally k
8. Corchorus Olitorius, Bunghi-paat of the Bengalese: the fibres of its bark, called J
9. Corchorus Capsularis, Ghee-nalta-paat of the Bengalese: the fibres of its bark they
10. Flax (Linum Usitatissimum): the growth of the Company's Hemp Farm, near C
11. Agava Americana: the fibres of its leaves. They are of a coarse harsh nature, and
12. Aletres Nervosus—In Sanscrit, Murva; Murga of the Bengalese: the fibres of it
having been kept above one year..
13. Theobroma Augusta, Linn.—Abroma Augusta, Hort. Kew.—Abroma Wheelerii, Kæn
the fibres of its bark prepared by maceration, &c. like hemp...............
14. Theobroma Guazuma, Bastard Cedar: the fibres of the bark of some straight, luxu
15. Hibiscus Tiliaceus, Bola of the Bengalese: the fibres of its bark, and employed for
South-Sea Islands, &c...
16. Hibiscus Manihot, a tall white-flowered variety: the fibres of its bark, which are be
17. Hibiscus Mutabilis: the fibres of its bark, and they are of a harsh nature and ill co
18. Hibiscus, a new species, from the Cape of Good Hope, said to be a native of Caffrari
19. Bauhinia, a large scandent species: the fibres of its bark, cleaned without macerati
by the people of Napaul, where the plant is common.......................
20. The same as No. 19, only maceration was used to help to take the bark off the twigs
21. Sterculia Villosa: the fibres of its bark. Cords are made of them by the natives of
bind wild Elephants, when first taken.................................

A cord, a very little thicker than a log-line, made of sun sail twine, broke with 148 pounds when dry; but, on
while wet, 222 pounds. This difference requires to be farther inquired in

ENTS made by Dr. ROXBURGH, of CALCUTTA, referred .djoining COMMUNICATION.

TERIALS employed in these EXPERIMENTSS.	Average weight at which each sort of cord broke.					
	White.		Tanned.		Tarred.	
	Large	Small	Large	Small	Large	Small
into cords, like the rest	105	65	..	..	..	..
's Hemp Farm, near Calcutta	74	50	139	60	45	46
ıbles and cordage over Asia	87	60	..	..	..	..
ı grow round the trunk of this species of Sago Palm	96	79	..	..	..	..
ark, prepared by maceration from the plants that had r, and harsh nature	88	64	101	55	84	39
plants coming into blossom; at which time they are	46	20	61	35	48	30
and universally known over India	68	47	69	55	60	37
its bark, called Jute by the same people	68	47	69	59	61	36
res of its bark they call Nalta Jute	67	47	..	..	..	..
mp Farm, near Calcutta	39	37	..	..	..	..
harsh nature, and white	110	71	79	78	78	38
e: the fibres of its leaves made into these cords, after	120	52	73	42	48	43
ma Wheelerii, Kæn.—Woollet-comal of the Bengalese:	74	61	58	51	44	29
ome straight, luxuriant, young plants	52	48	..	47	45	30
and employed for cordage by the inhabitants of the	41	..	62	39	61	..
bark, which are beautifully white, glossy, and soft	61	..	..	..	..	..
h nature and ill coloured	..	45	53	46	..	..
a native of Caffraria, where the fibres of its bark are spun	..	22	..	..	..	..
l without maceration, and used to make ropes, &c. of	69	39	..	..	..	..
bark off the twigs with more care	56	41	..	..	..	..
ı by the natives of the Eastern frontier of Bengal, to	53	..	..	..	..	..

ds when dry; but, on being soaked in cold water for 24 hours, it bore,
be farther inquired into.

they were prepared, chiefly with the view of allowing the effects of the tan and tar to take place. The result of these experiments show, that tan has in general added strength, while tar has had a contrary effect; and in no instance is this more clearly evinced, than in the common hemp (Cannabis) cultivated in Bengal.

To Ejoo and Coir, neither tan nor tar seem applicable; and in several of the other experiments, I had not a sufficient quantity of the materials to make the necessary number of cords, viz. six of each sort, to try with tan and tar, as well as in their natural state. At some future period, I hope to be more fortunate in procuring larger supplies of the materials, and also to add some other sorts, such as the—

Rajemahl bow-string fibre, the produce of a new species of Asclepias, discovered by William Roxburgh, junior, amongst the Rajemahl Hills;

New Zealand Hemp;

Hibiscus Cannabinus, and some other of the same natural order (Columniferæ); (for in general their barks abound with strong fibres; witness the foregoing table, where six of them are to be found);

The leaves of a new species of Andropogon, &c. &c.

APPENDIX,

Containing remarks on some of the Plants mentioned in the foregoing Table.

No. 2. Hemp, or Cannabis Sativa,— Banga, in Sanscrit; Bunga, Bungh, or Bung, of the Hindoos; Bang, of the Persians; Kinnub, of the Arabians, is no doubt our own famous plant, now so common and useful in Europe. I have at different times examined various figures and descriptions, as well as the plants reared from Europe seed, comparing them with our Indian plant through its various stages, and can discover no difference whatever, not even to found a variety on. Perhaps few vegetables, so widely diffused over almost every part of the known world, and under the immediate management of man, have undergone less change. It is perfectly familiar to all the nations of India, I may say of all the warmer parts of Asia; yet I cannot discover that the fibres of the bark have ever been employed for any purpose. It is cultivated in small quantities every where, on account of its narcotic qualities.— The leaves of the male plant, and flowers of the female, are the parts in most general use.

I have repeatedly applied for the seeds of all plants reared in China, and other countries to the Eastward of the Bay of Bengal, as well as to almost every other part of India we have any communication with, for an account of the plants employed to supply materials for clothes and cordage, and for their seeds; but could never learn that Cannabis was one of them; nor were its seeds ever sent to me as such.

No. 4. The great strength of this substance makes it a very desirable object. For a description and drawing of the tree, I refer to those* which accompanied my letter to the Most Noble the Governor-General in Council, under date the 2d of January, 1800. The fibres employed in these experiments were taken from trees growing in the Botanic Garden at Calcutta, where they thrive well. I could observe, during the trials made in breaking the cords of this substance, that they were not so elastic as those of Coir, which will probably render it less fit for cables, but better for many other uses. Coir is certainly the very best material yet known for cables, on account of its great *elasticity* and strength.

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* A former set, No. 1179, sent in to Government on the 23d of November, 1797, were not so correct as could be wished, on account of their having been taken from young trees, just coming into blossom the first time.

Nos. 5, 6, 7, 8, and 9. These four plants have already been figured and described by me, in a memoir sent through the Governor-General in Council, to the Hon. the Court of Directors, in December, 1795. Since writing that paper, I have learned, that *sun* (Crotolaria Juncea) is almost universally employed, over the warmer parts of Asia, for cordage. On the Malabar coast, I find it is generally named by the gentlemen at Bombay after the province where reared. It is used in that place for lacing their cotton bales, on account of its great strength. Samples of three sorts, viz. Malwan, Rajapore, and Salsette, were sent to me, from them, by Dr. William Hunter; and am induced to think, little or no maceration is employed in taking the bark from the stalks, or in cleaning the fibres, which may add to its strength: for certainly maceration, particularly if long continued, must weaken fresh vegetable fibres considerably. The same gentleman sent me seeds of the Salsette sort: they have produced plants now in blossom, and from them have ascertained the identity of this species.

In some parts of Bengal, a most luxuriant variety is cultivated immediately after the rains, which often grows to the height of twelve or fourteen feet; while the common sort is generally reared in Bengal during the early part of the wet season, and grows to only about half the height of the former.

I must farther observe, that the fibres of No. 5 possess great strength, and it seems to me to be one of the most fit of any of our Indian productions for cables and cordage. The plant grows generally to the height of from six to ten feet, the fibres long, but harsher than those of hemp, if not cut at an early period. It is very generally cultivated about Calcutta during the rains. An acre yields of the half-cleaned substance (the state in which the natives carry it to market), about 600 lbs. weight, and sells for about a rupee and a quarter per maund of 80 lbs.

No. 6. By cutting No. 5, the last-mentioned plant, when beginning to blossom, we have the most beautiful shining white fibres that can well be conceived, but (by my experiments) greatly weaker than when the seed is suffered to be nearly ripe before the plants are cut.

No. 10. Flax, the plant, is very generally cultivated during the cold season, over the interior parts of Bengal and Behar, merely for the seeds, from which oil is obtained. The flax itself the Hindoos set no value on; for, after they have gathered the seed, they throw away the stalks as useless, having no knowledge of the fibres which their bark yields. Samples of the flax have repeatedly been procured by the Board of Trade, and sent to England to the Hon. Court of Directors; so that it is from England we may expect to learn its properties. If the flax has been found good, large quantities may be reared at a small expense; as the seed alone, which the crop yields, must be more than equal to the charges, to render it profitable to the farmer.

No. 11. This Agava is of slow growth; on that account I doubt if ever it can be advantageously cultivated; but, where found wild in plenty, it may be manufactured at a trifling expense. Its great strength renders it an object worthy of attention. The fibres are coarse, consequently rope made of them harsh to the feel.

No. 12. Drawings, and a description of the plant Aletris Nervosus Roxb. the method of extracting the fibres, with a quantity of the substance itself, were sent to the Hon. the Court of Directors, through the Madras Government, above ten years past. I also gave a large quantity to Mr. Bebb, when he left Bengal in January, 1800, to take to England with him for trial there. The plant grows fully as well, and is as common as on the Coromandel coast. There has lately been about a biggah (third of an acre) planted out with it in the Botanic Garden, the better to determine the expense, and the annual produce of any given quantity of ground.

No. 13. This plant, a native of various parts of India, New South Wales, Philippine Islands, &c. has been long known to Botanists; yet I cannot, with all the attention that I have been able to bestow on the subject, find that the fibres, so abundantly interwoven through its bark, have ever been used or even taken notice of by any other person; so that I think we may look upon it as a new discovery, deserving of more than common attention, on account of the beauty, fineness, and strength of these fibres.

It is perennial, grows luxuriantly in the Botanic Garden, and has been cut down twice within these six or seven months; so that I think it will, at least, annually afford two or three crops of shoots fit for yielding this substance. My experience does not yet enable me to state how much may be the yearly produce of an acre, but can venture to prognosticate as large a produce as can be obtained from an acre of Dancha, Jute, Sun, Hemp, or Flax.

To render this bark separable from the half-ligneous shoots it covers, to soften its external lamina, or epidermes, and the parenchymatous substance which firmly connects the fibres in their natural state, maceration in stagnant water for from four to eight days, during the warmer parts of the year, answers well whilst three times as many days are scarce sufficient during the cold season; indeed, the process is scarcely practicable then; besides, the fibres are greatly weakened by the length of the maceration.

Immediately on being taken out of the water, and while wet, the shoots are singly taken in the hand, rubbed with some coarse materials, such as a little dry grass or gunny, to remove the exterior pulpy lamina or epidermis of the bark, which is destitute of fibres. This part of the process is easily effected; and when done, the clean shoots are to be made up into small bundles, and placed under weights, or some other equal pressure, to keep them firm at the middle and top, either under the surface of the waters, or out of it; the fibrous bark is then separated with the fingers from a small portion at the end of the ligneous shoot or stalk, which the operator takes hold of, and draws out one by one; when these are removed, the pulp, or parenchyma, which fills the interstices between the fibres, and connects them together, forming in the living plant that part of the bark which may be called its inner lamina, or cellular tissue, is immediately washed out in cold water, and the clean fibres spread out in the sun to dry. Such was the simple process by which this substance (which may very properly be called Indian Hemp or Flax) was prepared.

I have now under cultivation about the third of an acre (a biggah) of ground in the Botanic Garden with this plant; the result shall be carefully noted from time to time. It might have been prudent to have withheld this account until that time; but the strong desire of making known a discovery, which may in a short time become beneficial to the public, induces me to be thus precipitate.

For a farther account of this plant, I beg leave to refer to my drawing and description thereof, sent to the Hon. the Court of Directors some years ago, and numbered 415.

W. ROXBURGH.

Botanic Garden, near Calcutta,
Jan. 31, 1801.

Additional Experiments on the STRENGTH *of* SUN *(No. VII.)*

Some tanned sail-twine, made of this substance four years ago, for the inspection of the Marine Board, was made into a cord of three strands; each of the strands composed of four threads of the sail-twine.

Some more of the same sail-twine, tanned twelve months ago, was made into a similar cord, and another was made of the white unprepared twine.

The first, which had been tanned four years, broke with 110 lbs. when dry, and with 130 lbs. after having been steeped in water 24 hours.

The second, which had been tanned one year, broke with 123 lbs. when dry, and with 140 lbs. after steeping 24 hours.

The third, or plain white, broke with 148 lbs. when dry, and with 222 lbs. after steeping 24 hours.

The THANKS of the Society were, this Session, voted to Dr. ALEXANDER ANDERSON, of St. Vincent, for the following COMMUNICATION, relative to the ROYAL BOTANICAL GARDEN established in that Island.

SIR,

I AM honoured with yours of the 5th of July last. My long silence was owing to my absence from the Garden, to which I returned from Trinidad in the end of June.

I have the pleasure of informing you, that the wished-for addition of land to the Garden has been obtained, and a valuable acquisition it is, the whole being good soil, and a great part level; at least, so much so, that, with the precautions I have taken, it cannot be injured by washes from torrents of rain, which have totally destroyed the old Garden. The new part I reserve for the more valuable plants, as I proceed to procure them. For the enlargement, the Garden is much indebted to the exertions of the Society of Arts, and those of General Melville.

The two Nutmeg Trees are thriving luxuriantly: my sincere wish is, that they may be male and female. I think it rather strange, that plants of them, as well as of other useful productions of the East, have not been, before now, sent to these Colonies. Except the two Nutmeg Plants here, I believe there is not another individual in any of the British Islands on this side of the Atlantic. To the French we are indebted for all the most valuable of the East-India plants we at present possess.

On this side the water, Lord Seaforth is the only man at present who is using any exertion for the introduction of new and useful productions, or promotion of science: for these objects he spares no expense or labour. He sent a gentleman to Cayenne, in hopes to procure some of their valuable plants, but in vain; for Victor Hugues was not so generous to him as to me; all the liberty he got, was permission to pick indigenous plants. Lord Seaforth intends to make application to the King, to send a ship to the East Indies with the sole intention to bring plants and seeds directly to this Garden. I hope he will succeed.

If it is in my power to forward any thing from hence, that may be acceptable to the Society, I will regard myself honoured in their commands. Any plants or seeds from England, which you can furnish, that are likely to prove useful in food, commerce, medicine, or economy, will be a great acquisition to this Garden. Merely as a sample for the Society, I have transmitted you a few seeds of different plants; also a little Terra Japonica, or inspissated juice of Mimosa Catechu: if the Society think it will prove a substitute for the Eastern, or if the article is of value at present, pray inform me, as I can make any quantity of it, having plenty of the trees. The only process I used was, to boil pieces of the wood and bark together in a common earthen pot; therefore it may perhaps not be equal in taste and colour to that of the East Indies.

Some Tea Trees, Pepper, and Mulberry, which I have planted in the new ground, are thriving remarkably well, as is the Manna Ash. The Mulberry I fancy to be of little value: if it is, let me know, that I may increase it.

I am ever, with great regard,
SIR,
Your much obliged
and obedient Servant,
ALEXANDER ANDERSON.

Botanical Garden, St. Vincent,
Nov. 18, 1803.

CHAS. TAYLOR, Esq.

⁂ The articles mentioned in the above letter, and which are noticed by Dr. Anderson to have been forwarded to the Society in a small parcel, by John Thos. Rayner, Esq. have not yet been delivered to them.—If retained by any person, from a mistake in the address, they are requested to be sent to the Society's House in the Adelphi, addressed to the Secretary.

December, 1804.

The SILVER MEDAL of the Society was this Session voted to Mr. WALTER BAINE, of Greenock, as a Bounty for his Experiments and Endeavours, made during the last Session, to improve the method of CURING WHITE HERRINGS, taken on the coast of North Britain, and as an encouragement to induce him to make farther trials.

THE Herrings sent from him to the Society were superior in quality to those usually prepared on the coast of Scotland, but not equal to the Dutch Herrings. It appears from the account given by Mr. Baine, that the Dutch method of treatment of the Herrings, from the time they are caught until they are landed, is known in North Britain; but that the knowledge of their treatment from the time they are brought from the Fishery until they are sent to market, is more uncertain, and that Dutch Curers should therefore be procured to complete an object of such great national importance.

The Society, anxious to furnish useful information relative to the Herring Fisheries, have annexed a Translation, with which they have been favoured by J. Hinckley, Esq. F.S.A. one of their Members, from a valuable Treatise on this subject in the German language.

The DUTCH METHOD *of* CURING HERRINGS, *extracted and translated from the German of Krünitz's Economical Encyclopædia* (Oeconomische Encyclopädie), *article Häring, by* J. HINCKLEY, *Esq. F.S.A.*

The vessels employed in this fishery, commonly called herring-busses, from the Dutch name, are generally between 48 and 60 tons burthen, though some from 40 to 80 and 100 tons are used. The largest of all carry 120 tons, are three-masted vessels, with one deck, and a cabin at each end; that a-head serving as a kitchen. Of the larger, the crews are 24 men, those of the smaller 18. They carry a few small guns and musquetry.

Their nets are dipped, or cast out, in the evening, and drawn up in the morning. It requires three hours to wind them on board. From the net, the fish are immediately put into baskets, while others of the crew are occupied till evening in gutting, salting, and packing. But although from ten to fifteen last are sometimes taken at a draught, the twelve persons usually employed for the purpose, cannot complete more than five last in a day.

During the three first weeks, from the 25th of June to the 16th of July, all the fresh-caught herrings are thrown into casks without picking, and conveyed to Holland, in the jägers, or yachts,* that accompany the herring-busses. But, after this period, immediately on being got on board, and gutted, they are assorted into three qualities,—maiden herrings, full herrings, and shot herrings. The first of these are those taken earliest, and without row or melt, but which, though well flavoured, do not keep. Full herrings are those taken at Midsummer, on the point of spawning; from which the brand-herrings, so called from the barrels being marked with a hot iron, only differ in being caught later, re-packed immediately on arrival, and so close and hard pressed down, that they do not require re-packing at other places, but only new pickle; and are immediately expedited, or may remain on hand: whereas the other two sorts, not being so closely laid, must absolutely be re-packed. Shot-herrings are those which have spawned, or are taken in the act of spawning, in consequence of which they are thin and lean.

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* These are small fast-sailing vessels, which follow the herring-busses, supply them with provisions, casks, salt, and other necessaries, and carry the fish that have been taken to the nearest port, where they are re-packed, and prepared for sending to the places of their destination.

With the last two sorts the busses themselves return (as soon as they have got their loading, or find no more fish), one after another, to port, where all three sorts, except the brand-herrings, before being expedited, are opened, salted anew, re-packed, and so heaped up, that fourteen casks are re-packed in twelve, which make a last. By a regulation of the States-General, this re-packing must be performed in the open air, where strict watch is kept, that the spoiling fish be carefully separated from the good, and the latter properly laid in the barrels, and strongly pressed down.

The Dutch fishery continues generally from twenty to twenty-six weeks, or even somewhat longer, namely, from the 25th of June to the middle of January. The Dutch fish only on the Scotch and English coasts, off Hittland, Fairhill, and Bocken, from Midsummer, till the 25th of July; off Bocken or Serenial, from thence till the 14th of September; and in deep water, East of Yarmouth, and as far as the mouth of the Thames, from thence to the 25th of November, when the regular fishery ceases. But herrings are found not far from Yarmouth till the end of January, after which the fishery is prohibited, as the spawning season then commences.

Herrings, however, are equally good, wherever they are taken, provided they be but caught in the proper season, and well managed. As they die immediately on quitting their element, salting and packing are the circumstances which principally affect their quality. The superior excellence and flavour of Dutch herrings, above those of all other countries, arises from the close attention and indefatigable industry employed. Every thing, however minute, both as to season and management, which can maintain the reputation they have enjoyed for more than two hundred years, is most punctually observed; and above thirty ordinances on the curing and management of herrings are recited by Sir William Temple, in the 17th century.

Herrings, cured with Scotch salt, very quickly decay. Those of Norway are cured in the same manner as the Scotch, but with French salt, and packed in fir or deal; in consequence of which they are worse, and less palatable, as they leave a sour taste in the mouth, and soon spoil. In like manner, other nations are equally careless in assorting the fish, and to this may be attributed the precedency which the Dutch herrings have so long maintained. The Dutch catch their fish regularly and early off Hittland, from the 25th of June, because they are then, and to the beginning of July, fattest; after which time, the nearer they approach the coast, the leaner and worse they are.

It redounds no less to the honour of the Dutch, than to their advantage, that they pay the utmost possible attention to these rules: according to which, the fish must be taken at the proper season, properly salted, well assorted, and rightly packed; to do all which, the captain and sailors are by several laws obliged to bind themselves by oath, before they sail. There are also overseers well paid, that they may not betray their trust, but watch and enforce every the minutest regulation; to which circumstance also, the pre-eminence of

Dutch herrings throughout the world may partly be ascribed.

As soon as the herrings are taken out of the water, they are thrown either upon the end of the deck, which has been cleared, and made perfectly clean for the purpose, or into baskets; and then *gipped* (the gills and guts taken out) with a knife, by some of the crew, who are solely employed therein, having been brought up to that practice. The milt, or roe, however, is always left in the fish.* What are taken during one night, are, before the following sun-set, neatly and skilfully laid in oaken barrels, coarse Spanish or Portuguese bay salt being strewed between. This the fishermen of other countries either entirely neglect, or less carefully perform, being less scrupulously nice; because they either go out to sea later, or, like the Scotch, commence fishing too soon; or only navigate small boats near the coast; do not kill the fish with a knife, or gut, salt, or pack them, while on board, but throw them down in a boat, and when fully laden, go on shore, proceed at their leisure, cast the fish on the sea-coast in considerable heaps, where they are even suffered to lie sometimes several days, before they are gutted, salted, and packed, in consequence of which they grow stale and ferment. The Dutch, on the contrary, indefatigably pursue their method day and night, during twenty, twenty-four, or twenty-six weeks, be the weather what it may. Hence, their fish are usually more tender, better flavoured, and not so very salt as the English and the Scotch.

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* Mr. M'Culloch's Treatise (see note, page 413) says, they should also be kept cleanly, and out of the sun, as well as frost or rain.

There are two methods of salting and preserving herrings for a considerable length of time. The one is called white salting, the other red. The former is thus performed. Immediately on being taken, the fish are gutted, as above described, and washed in clean water, Then salt is sprinkled on them, either internally, or both within and without, and the fish, being thrown into large baskets with handles, are well roused, (or shaken about a few times) that the salt may the better diffuse itself, and penetrate: or, lastly, which is the best method, they are thrown into a tub filled with a strong brine made with bay salt and fresh water, in which an egg will swim. In this pickle they are left upon deck in the open air, provided the weather be good, during twelve or fifteen hours; but, if circumstances require, a good deal longer, and are well stirred (especially if pickled on shore) with shovels several times, that the salt may the better and more generally penetrate every where. Lastly, to pack them properly, they are taken out of the pickle, suffered to drain sufficiently,

ciently, and then packed in barrels, which are strewed at bottom pretty thickly with salt, and, if there is time enough, they are neatly laid in strata or layers, always strewing sufficient salt upon each layer. But, if the abundance of fish be too great, they are thrown in promiscuously, with as much salt as is requisite to preserve them from spoiling. When this is done in strata, each new layer is pressed down hard upon the preceding. This last-mentioned process, however, cannot easily be attended to at sea, especially when the fishery is very abundant. Hence, if the fish are to be exported, or remain long unused, they are re-packed on shore, laid in fresh salt, and pressed down hard; without which precaution herrings exported by sea would spoil. The same practice is pursued in France, Hamburgh, and doubtless elsewhere. At Hamburgh, as in Holland, they are packed in the open air, ten packers and three overseers being appointed for the purpose, and all sworn. Besides re-packing, the packers in the maritime towns have also to pick and assort the fish, according to their goodness, salt them anew, and put them in fresh pickle. It is also generally a part of the magistrates and trading companies oaths, not to suffer any bad fish to be delivered from the quay or custom-house.

After packing, whether the goods are intended for exportation or home-consumption, whether pressed down hard or not, they are regularly coopered, that the pickle may not leek out, and the fish turn yellow or spoil, which takes place the moment they are deficient in pickle. Properly, the herrings should, on the very day on which they are taken, not only be gutted, but salted and put in casks, or at least should not lie more than one night in the first pickle. And accordingly such herrings are distinguished in France by the name of *Harengs d'une nuit.* But, when the fishery is abundant, this is not always possible; so that only a part can be properly attended to; and the rest, after being gutted, must unavoidably remain, at least the whole following day, if not longer, in the first pickle, the regular packing of them being postponed till the third day. These fish, having stood two nights on deck in the open air, are called *Harengs de deux nuits.* But such goods not only are inferior, but do not keep so well as the former.

If the fishermen mean again to cast their nets on the following night, or if, on account of the great abundance of the shoals, they do not expect to complete the salting and regular packing in two days, the fish, which they cannot so complete, are salted in large heaps, and are then called *Slabbers,* or *Slabbegut,* coarse goods. These are frequently too salt, because want of time prevents their being properly managed. They are put into the schuyts, which always accompany the herring-busses, and washed; after which they are smoked; though not so much as the *Bicklings* (Bücklinge) or red-herrings. The salted herrings, hitherto spoken of, are called *Böckel herringe*, or pickled herrings, or, in general, plainly *Herrings*; those properly salted and packed in layers, *Packed*, or *Barrel herrings*; and those half-salted, and promiscuously packed in barrels, *Wrack herrings*.

The other mode of curing, called Red-salting, is thus performed. When the fish are taken out of the above-described pickle, in which, however, they must remain longer than those intended for the common, or white-salting, and at least four-and-twenty hours; they are hung by the head in rows on wooden poles, in stoves constructed for the purpose; each of which generally contains 12,000 herrings. Being thus placed, a fire is made under them with vine-stalks, or any green faggot-wood, that affords much smoke and little flame.* Here they remain till dried, and properly smoked, which generally requires twenty-four hours. Thus they become Bicklings, or Red-herrings; when these are packed in barrels, they are called Barrelled Bicklings, and are much salted; but, if laid in straw, they are called Straw Bicklings, and are somewhat less salted. The excellence of the Bicklings principally consists in their being large, fat, tender, fresh, properly salted, pliable, soft, of the colour of gold, and not torn or mangled. In Holland, the best fish are chosen for this purpose;

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* At Bremen, the place most celebrated for smoking fish, and where no secret is made, as in Holland, of the process, they are hung in ovens of the size of a small parlour, and strict attention is paid not to use fir, or any wood, in which is any the least turpentine or resinous matter, which invariably gives a bad taste to the fish.

but in other places, the above-described Slabbers only are used, or other inferior herrings, deemed unfit for the usual mode of salting. The best and fattest smoked Dutch herrings are called, in German, *Speckbucklinge*, or fat red-herrings; in low Saxon, *Flickhäringe*; and in Hamburgh *Fläkheeringe.* They are cut open along the back*

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* The Act of Parliament regulations, and many useful observations, may be seen in two small tracts, 8vo, in possession of the Society for the Encouragement of Arts, Manufactures and Commerce, the one entitled, " Observations on the Herring-fishery, upon the North and East Coasts of Scotland, &c. with plain Rules, proposed for curing, and for supplying the London Market with White Herrings, by Lewis M'Culloch, many years employed in furnishing the merchants of London with herrings for exportation. London. Richardson, 1788;" the other, entitled, " The best and most approved Method of curing White Herrings, and all kinds of white fish, containing particular directions how to slit, gut, salt, dry, and barrel them, fit for sale at home or foreign markets, with directions for boiling of oil, by a Trader in Fish. London. J. Davidson. 1750."